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ABSTRACT

This paper is concerned with the need for science teachers to encourage women students to pursue professional science careers. It presents five hypotheses that are often assumed about women and counters with five strategies that can be used. These are: (1) Deficiency hypothesis/Remediation strategy; (2) Unfeminine career hypothesis/Career selling strategy; (3) Role conflict hypothesis/Role resolution strategy; (4) Job seeking hypothesis/Assertive skills strategy; and (5) Discrimination hypothesis/Antidiscrimination strategy. Each pair is discussed in detail. A bibliography is included. (MA)

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Five Approaches to Increasing Participation of Talented Women in Science Careers

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When we science teachers face our women students, we must remember that almost without exception they will work for wages sometime during their adult lives; and a majority of these women students will probably be employed more than 25 years. It seems reasonable that since they will be employed, they ought to pursue careers which compliment their interests and abilities and which allow them to pursue their desired life style. Women can pursue the entire range of careers; and many women have the necessary ability and interest required to pursue and profit from traditionally male science careers like engineer, veterinarian, research scientist, dentist, and physician. However, even when we accept the arguments that (1) women will and ought to seek careers and (2) many of these women have talent in and could profit from science careers, the question remains for us science teachers, "How can I encourage my talented women students into professional science careers?" The answer to that question rests on making one or a combination of five hypotheses. In this paper I will briefly describe each of the five hypotheses and strategies we might use, if we assume one of the hypotheses.

The significant contributions of my University of Kansas colleagues, Dr. Kala M. Stroup, Dean of Women, and Dr. Caryl K. Smith, Associate Dean of Women and Director, Emily Taylor Women's Resource and Career Center, are gratefully acknowledged. The ideas in this paper are expanded and an extensive bibliography provided in two publications in which I collaborated with Drs. Stroup and C. Smith.

Smith, C. K., Smith, W. S., and Stroup, K. M. Counseling Women for Nontraditional Careers. 1977. Available from ERIC Counseling and Personnel Services Information Center, University of Michigan, Ann Arbor. $4.

Smith, W. S. and Stroup, K. M. Science Career Exploration for Women. Available from National Science Teachers Association, 1742 Connecticut Ave., N. W., Washington, D.C. 20009. $2.50.

(1) Deficiency Hypothesis/Remediation Strategy - We may hypothesize that few women pursue professional science careers because they lack some specific required ability or they possess some negative attitude that impedes their science career pursuit. For example, we may hypothesize that many otherwise talented women are impeded from entering engineering because they lack mechanical skills, or from agriculture because they lack basic farming information, or from architecture because they lack some spatial visualization ability. Currently much interest has been generated over math anxiety, a negative attitude toward mathematics which prohibits a person from studying math and therefore precludes their entering careers requiring math skills.

In the face of this deficiency hypothesis, we can institute remedial programs aimed at correcting the deficiency. In this vein Dr. Betty Pollack at the University of Oklahoma developed an engineering program for women, including special instruction in shop machinery--arc welders, lathes, hand tools, and the like. Dr. Lenore Blum at Mills College and Dr. Sheila Tobias at Wesleyan have developed programs to overcome math anxiety, so that women could enter into math instruction and hurdle that obstacle to many careers.

(2) Unfeminine Career Hypothesis/Career Selling Strategy - Perhaps women don't pursue certain science-related careers because it's unladylike to do so. Myths abound to supposedly justify why

women should not enter certain careers. Physicians spend long hours away from home; civil engineers muck around in the mud; pharmaceutical salesmen (sic) must travel and remain overnight on the road; physicists aren't pretty; geologists have to be rugged to get along in the field. In short, we may hypothesize that many women are kept from pursuing professional science careers because of the unfeminine aura hanging around these careers. "Pursuit of these careers means loss of femininity."

In the face of this hypothesis, we can employ a strategy which demonstrates either that femininity is not an important issue in career selection and/or that people (male, as well as female) can engage in these careers and still possess all these good traits which traditionally have been associated with femininity. One technique is the use of role models who either come to the school to talk with classes or special groups of students and sometimes parents or are visited at their worksite. Also, several books, pamphlets, and films can be helpful in selling a professional science career. For example, we can use Joyce S. Mitchell's I Can Be Anything or Suzanne Seed's Saturday's Child, two books about women and various careers, or two pamphlets about science careers, American College Testing Program's Women in Science and Technology: Careers for Today and Tomorrow and The Lawrence Hall of Science's I'm Madly in Love with Electricity, or a movie from Bell Telephone, A World for Women in Engineering.

(3) Role Conflict Hypothesis/Role Resolution Strategy - Parent. . .spouse. . .career person. How can one pursue all these roles and do justice to each one? Is it morally right to pursue all these roles? Questions revolving around a perceived conflict of roles abound and the perception of role conflict may impede a woman's choice of a professional science career, because such a career inordinately or immorally conflicts with being a spouse and/or parent.

(Incidentally, our research on talented college women's perception of barriers to their pursuit of professional science careers indicates a significant difference between traditionally male science career aspirants and others. The talented women (who have high math and science ability) who choose to pursue traditionally male science careers perceive less conflict among roles of parent, spouse, and career person than is perceived by similarly talented women who do not choose to pursue traditionally male science careers.)

If one hypothesizes that perceived role conflict is an important barrier to talented women's pursuit of science careers, then how can the barrier be attacked? First of all, career choices cannot be made separate from other basic life choices. Parent, spouse, and career roles must be seen as interrelated and decisions relative to each role affects decisions made in the other two roles. Since these roles must be viewed as inter-dependent, we have engaged young women in activities in which

they examine their (1) life goals, (2) talents and resources, and (3) decision making process (with emphasis on what factors affect their decision and on whether they make decisions or just "roll with the punches"). The key message of these activities is take control of your life (not to get rid of conflict, because indeed conflict may exist, but rather to reduce one's inability to handle one's feelings about role conflict.) (Parenthetically, I deplore the current situation in which for many men an absolute wall is built between career decisions and family/spouse decisions. Such a division, with career decisions usually being made first, yields a lopsided emphasis on career at the expense of family and spouse.) Science Career Exploration for Women describes many activities which teachers and counselors can use in dealing with the role conflict hypothesis (and some of the other hypotheses).

(4) Job Seeking Hypothesis/Assertive Skills Strategy - A fourth alternative hypothesis regarding what barriers may impede a woman's pursuing a nontraditional science career is that a woman may never have learned how to aggressively seek out a career or job. This inability particularly affects some women when they look for employment, but similar problems may impede a career choice.

Richard Bolles' What Color Is Your Parachute is an excellent resource for the person who is thinking about changing careers,

but many of our students have found it helpful to them to make career decisions. Career Development Packets by Caryl Smith and Julie Gordon focus not only on career choice but also on job seeking skills and assertive interviewing. These packets are particularly appropriate to use with groups of students.

(5) Discrimination Hypothesis/Antidiscrimination Strategy - The first four hypotheses assume that "the problem" is primarily within the woman (she lacks a skill, she views certain careers as unfeminine, she perceives an irreconcilable conflict among career, spouse, and parent roles, or she lacks assertive job and career seeking skills). The fifth hypothesis, however, assumes that "the problem" is primarily outside the woman. Some people inadvertently or intentionally discriminate against women in admissions practices, awarding of scholarships, selection for awards and honors, hiring, job assignment, advancement, and so forth. Moreover, family, peers, teachers, and counselors may apply subtle or direct pressure on a woman to not select a traditionally male professional science career.

The first part of our antidiscrimination strategy is for us to "clean up our own act." Whom do we encourage into the science fair? Whom do we send to visit the engineering college counselor when they visit our high school? Does any part of our admissions procedure preclude the selection of women? Whom have we selected to receive those extra attentions of a protege? Title IX requires

most educational institutions to ferret out and end discriminatory practices; however, subtle, but legal, discriminatory practices can still remain and need to be addressed.

Despite our best efforts, however, discrimination remains and our students need to learn to deal with it. Assuming that knowledge of how discrimination operates is the best defense against it, we have encouraged our students to read and discuss books like Cynthia Fuchs Epstein's Woman's Place. Also, we have asked students to discuss with family, friends, and role models particular aspects of discrimination and, in the case of the role models, how they have dealt with discrimination.

An Afterword. Since the start of this decade, many more of our talented women students have chosen professional science careers and doors previously closed are beginning to open. However, each of the problems represented by the five hypotheses remain; but we classroom teachers are in a unique position to help our students combat the problems, thus enabling them, if they choose, to pursue careers in which they have talent and interest.

Resources

American College Testing Program. Women in Science and Technology: Careers for Today and Tomorrow. Iowa City: Author. 1976. (Pamphlet)

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Smith, W. S. and Stroup, K. M. Science Career Exploration for Women Washington, D. C.: National Science Teachers Association, 1742 Connecticut Ave., N.W., 20009. 1978. $2.50. (Describes many procedures teachers and counselors can use with students. Refers to many additional resources.)